

Claims

1. (currently amended) A chimeric empty capsid of the infectious bursal disease virus (IBDV), ~~characterized in that it is constituted~~ produced by assembly of a plurality of (i) IBDV pVP2 proteins and (ii) fusion proteins comprising a region A ~~comprising an~~ constituted by the IBDV VP3 protein and bound to a region B ~~comprising~~ constituted by a heterologous polypeptide ~~comprising a polypeptide of interest~~.

2. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said region B is bound to the amino-terminal region of IBDV VP3[[,]] or ~~alternatively to~~ the carboxy-terminal region of IBDV VP3.

3. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said polypeptide of interest is a polypeptide useful in vaccination, therapy or diagnosis.

4. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said region B comprises a single polypeptide of interest.

5. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said region B comprises two or more polypeptides of interest.

6. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said fusion protein comprises a region A bound to a single region B.

7. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 1, wherein said fusion protein comprises a region A bound to a first region B and a second region B ~~two regions B, which first and second regions B are the same~~ equal or different, wherein the first region B is one of them bound to the amino-terminal region of the VP3 of present in region A[[,]] and the second region B is bound other one ~~to~~ to the carboxy-terminal region of the VP3 of present in region A.

8. (currently amended) The chimeric empty capsid of ~~Capsid according to~~ claim 7, wherein said first and second regions B contain a plurality of heterologous ~~more than one~~

polypeptides, which heterologous polypeptides are the same of interest equal to or different from one another.

9. (currently amended) The chimeric empty capsid of ~~Capsid according to claim 1,~~ wherein said fusion protein further comprises ~~[[,]]~~ a linker ~~polypeptide~~ located between said regions A and B.

10. (currently amended) A nucleic acid, ~~said nucleic acid having comprising~~ a nucleotide sequence ~~which comprises the nucleotide sequence encoding for~~ that encodes the fusion protein ~~defined in anyone of claim~~ ~~[[s]] 1 to 9.~~

11. (currently amended) The nucleic acid of claim 10, ~~A nucleic acid, said nucleic acid~~ having a nucleotide sequence which comprises (i) ~~a nucleotide sequence comprising the open reading frame corresponding to the IBDV VP3 protein and~~ (ii) ~~a nucleotide sequence comprising the open reading frame of one or more heterologous polypeptides comprising one or more polypeptides of interest wherein in the resulting fusion protein said heterologous polypeptide is bound to the amino-terminal region of IBDV VP3.~~

12. (currently amended) The nucleic acid of ~~Nucleic acid according to claim 11,~~ further comprising (iii) a nucleotide sequence comprising an ~~the~~ open reading frame corresponding to the IBDV pVP2 protein.

13. (currently amended) A gene construct comprising the a-nucleic acid of ~~according to claim 10 or 11.~~

14. (currently amended) A gene construct comprising the a-nucleic acid of ~~according to claim 12.~~

15. (currently amended) An expression system ~~selected from:~~
~~—— a) an expression system comprising~~ the a-first gene construct of ~~according to claim 13~~ ~~[[,]]~~ operatively bound to a ~~transcription, and optionally translation,~~ control element ~~[[s]], and a second gene construct~~ ~~[[,]]~~ operatively bound to ~~transcription, and optionally translation, control~~

elements; said second gene construct comprising a nucleotide sequence comprising the open reading frame corresponding to the IBDV pVP2 protein; and

— b) an expression system comprising a gene construct according to claim 14, operatively bound to transcription, and optionally translation, control elements.

16. (currently amended) The expression system of ~~Expression system according to claim 15, wherein said expression system is a being selected from~~ plasmid[[s]], a bacmid[[s]], a yeast artificial chromosome[[s]] (YAC[[s]]), a bacteria artificial chromosome[[s]] (BAC[[s]]), a bacteriophage P1-based artificial chromosome[[s]] (PAC[[s]]), a cosmid[[s]], or a virus[[es]], which optionally contain a heterologous replication origin.

17. (currently amended) A host cell comprising the ~~containing~~ a nucleic acid according to anyone of claim[[s]] 10 to 12, or a gene construct according to anyone of claims 13 or 14, or an expression system according to anyone of claims 15 or 16.

18. (canceled)

19. (currently amended) The host cell of ~~Host cell according to claim 17 or 18,~~ said cell being selected from a mammal cell, an avian cell, an insect cell and a yeast.

20. (currently amended) A method for producing ~~process for the production of~~ chimeric empty capsids of the infectious bursal disease virus (IBDV) ~~according to anyone of claims 1 to 9,~~ comprising culturing a host cell according to anyone of claims 17 to 19, and, if desired, recovering said chimeric empty IBDV capsids comprising the nucleic acid of claim 10.

21. (currently amended) The method of ~~Process according to claim 20,~~ wherein said host cell is an insect cell and wherein the nucleic acid is a recombinant baculovirus, ~~comprising the steps of:~~

a) ~~preparing an expression system selected from (I) and (II), wherein:~~

~~expression system (I) is constituted by a recombinant baculovirus containing a~~
~~gene construct according to claim 14; and~~

~~expression system (II) is constituted by a first recombinant baculovirus containing a gene construct encoding for the IBDV pVP2 protein, and a second recombinant baculovirus containing a gene construct according to claim 13;~~

~~b) infecting insect cells with said expression system prepared in step a);~~

~~c) culturing the infected insect cells obtained in step b) under conditions allowing the expression of recombinant proteins and their assembly to form chimeric empty IBDV capsids; and~~

~~d) if desired, isolating and optionally purifying the chimeric empty IBDV capsids.~~

22. (currently amended) The method of Process according to claim 20, wherein said host cell is a yeast and wherein the nucleic acid is a plasmid, ~~comprising the steps of:~~

~~a) preparing an expression system constituted by a plasmid containing a gene construct according to claim 14;~~

~~b) transforming yeast cells with said expression system prepared in step a);~~

~~c) culturing the transformed yeasts obtained in step b) under conditions allowing the expression of recombinant proteins and their assembly to form chimeric empty IBDV capsids; and~~

~~d) if desired, isolating and optionally purifying the chimeric empty IBDV capsids.~~

23. (canceled)

24. (currently amended) A medicament comprising the ~~The use of~~ chimeric empty capsids of the infectious bursal disease virus (IBDV) ~~according to anyone of claim[[s]] 1 to 9 in the manufacture of a medicament.~~

25. (currently amended) The medicament of claim 24~~Use according to claim 24~~, wherein said medicament is a vaccine.

26. (currently amended) The medicament of claim 24~~Use according to claim 24~~, wherein said medicament is a gene therapy vector.

27. (currently amended) A vaccine comprising a therapeutically effective amount of the chimeric empty capsids of the infectious bursal disease virus (IBDV) ~~according to anyone of claim[[s]] 1 to 9, optionally together with and~~ one or more pharmaceutically acceptable adjuvants ~~and/or vehicles~~.

28. (currently amended) The vaccine of A vaccine according to claim 27, wherein the vaccine useful to simultaneously protects at least one of an animals or and a human[[s]] against infection caused by two or more disease-causing infectious agents.

29. (currently amended) A gene therapy vector comprising the a chimeric empty capsid of the infectious bursal disease virus (IBDV) ~~according to anyone of claim[[s]] 1 to 98~~.

30. (new) The expression system of claim 15, further comprising a second gene construct operatively bound to a transcription control element, said second gene construct comprising a nucleotide sequence comprising an open reading frame corresponding to the IBDV pVP2 protein.

31. (new) An expression system comprising the gene construct of claim 14 operatively bound to a transcription control element.

32. (new) The method of claim 20, further comprising recovering said chimeric empty IBDV capsids.